A secretary occupies the other side of the room, and is constructed of three thousand pieces of wood. The design is unique, and the manner in which a number of secret drawers are stowed away is something marvellous. The centre-table is also of her construction, and is very handsome. The cornices, picture-frames, stools, and chairs are all from the deft fingers of Mrs. Olenson. A magnificently carved bedstead graces their sleeping apartment, and other articles of minor importance are scattered about the rooms. Mrs. Olenson has manufactured nearly all her wooden tools, and a greater part of her steel ones. She is thirty-six years of age, tall and straight, fair, pleasant, and determined. She was taught her trade by her father in the old country, and puts it to the good use of furnishing her own house in a style that would be envied by the majority of people in much better circumstances in life.

THE wooded country of Eastern Texas yields a rich variety of useful woods—yellow pine, cypress, red and white oak, live-oak, hickory, pecan, and cedar predominating. The Trinity, Sabine, Neches, Angelina, San Jacinto, and other rivers afford rafting facilities and water-power at times, although water is an uncertain commodity in the State, and nearly all mills have steam-engines. A new road will soon bisect the lumber district springing from Denison, near the Red River, and traversing the State to Sabine Pass, which is sixty miles east of Galveston, and already an important lumbering point.

SCREWS can be driven in easier and firmer, and with less liability of splitting the heads, by using a little soap in their threads.

" NEATNESS, order, and economy" should be the motto in every shop.

## The Framing Square.

BY WM. E. HILL.

THE "framing square" is a steel tool having two arms at right angles to each other ; the longer and wider arm is called the "blade," the shorter arm the "tongue." The blade in good squares is 2 inches wide and 24 inches long, while the tongues on the same squares are $1\frac{1}{2}$ inches wide and from 14 to 18 inches in length. A lucid description of the tool, with many of its capabilities, was published in the *American Builder* during the year 1876, and subsequently ; some things, however, which were not described in the papers referred to I propose to discuss in this, and following papers.

Fig. 1, Plate 83, shows a portion of a first-class square ; the diagonal scale on the tongue is designed to aid the workman in obtaining minute measurements. The lines between *a* and *b* are one tenth of an inch apart, so also are the lines between *b* and *c*. It will also be seen that diagonal lines are drawn across the spaces from point to point. The primary divisions are tenths, and the junction of the diagonal lines with the longitudinal parallel lines enables the operator to obtain divisions of one hundredth part of an inch ; as, for example, if we wish to obtain twenty-four hundredths of an inch, we place the compasses on the "dots" on the fourth parallel line, which covers two primary divisions, and a fraction, or four tenths, of the third primary division, which added together makes twenty-four hundredths of an inch. Again, if we wish to obtain five tenths and seven hundredths, we operate on the seventh line, taking five primaries and the fraction of the sixth where the diagonal intersects the parallel line, as shown by the "dots," on the compasses, and this gives us the distance required.

The use of this scale is obvious, and needs no further explanation.

The "board measure," as shown on this square, gives the feet and inches contained in each board according to its length and width. Under Fig. 12 on the outer edge of the blade, the length of the boards, plank, or scantling to be measured is given, and the answer in feet and inches is found under the inches in width that the board, etc., measures. For example, take a board nine feet long and five inches wide ; then under the Fig. 12 on the second line will be found the figure 9, which is the length of the board ; then run along this line to the figure directly under the five inches (the width of the board), and we find three feet nine inches, which is the correct answer in "board measure." If the stuff is two inches thick, the sum is doubled ; if three inches thick, it is trebled, etc., etc. If the stuff is longer than any figures shown on the square, it can be measured by dividing and doubling the result.

The "brace rule" is on the tongue of the square. This rule is easily understood ; the figures on the left of the line represent the "run" or the length of two sides of a right angle, while the figures on the right represent the exact length of the third side of a right-angled triangle, in inches, tenths, and hundredths.

The "octagonal scale" (Fig. 2) is on the opposite side of the square to the "brace rule," and runs along the centre of the tongue. Its use is as follows : Suppose a stick of timber ten inches square. Make a centre line, which will be five inches from each edge ; set a pair of compasses, putting

one leg on any of the main divisions shown on the square in this scale, and the other leg on the tenth subdivision. This division, pricked off from the centre line on the timber on each side, will give the points for the gauge-lines. Gauge from the corners both ways, and the lines for making the timber octagonal in its section are obtained. Always take the same number of spaces on your compasses as the timber is inches square from the centre line. Thus, if a stick is twelve inches square, take twelve spaces on the compasses; if only six inches square, take six spaces on the compasses, etc., etc.

Fig. 3 shows how a common rafter can be laid out, and the proper angles or levels obtained, by a practical application of the square. Avoid lining for a "lookout;" give ample length for projection. Take pitch of roof on tongue, and half the width of building on blade; the angle along edge of blade then, is the bevel of foot of rafter; the "lookout" or projection must be provided for independent of the actual length of the rafter. Run the square along the rafter as many times as there are feet in half the width of building.

To find the hypothenuse when the base and altitude are given: let $a$ equal altitude, $b$ the base, then $a^2 \times b^2 = y^2$ the hypothenuse, etc. This is the rule on which the foregoing is based. Braces of different runs may also be found by the use of the square as above, under the principles contained in the rule. A full explanation of the use of the square for getting rafters and braces under the above rule, can be found in the *American Builder* for 1876.

Fig. 4 shows how an octagon can be produced by the aid of a steel square. Prick off the distance *a o* equal to half the distance of the square; mark this distance on the blade of the square from *b* to *o*, place the square on the diagonal, as shown, and square over each way. Do the same at every angle, and the octagon is complete.

To obtain the same figure with the compasses, proceed as follows: Take half the diagonal on the compasses, make a little over a quarter sweep from *c*, and at the intersection at *d* and *c*, then *d* and *c* form one side of an octagonal figure.

Again: take a piece of timber twelve inches square, as Fig. 5; take twelve inches on the blade from *a* to *b*, mark at the point *a*, operate similarly on the opposite edge, and the marked points will be guides for gauge-lines for the angles forming an octagon. The remaining three sides of the timber can be treated in the same manner.

These points can be found with a carpenter's rule as follows: Lay the rule on the timber, partly opened, as shown in the cut, "prick off" at the figures 7 and 17 as at *a* and *b*, and these points will be the guides for the gauge-lines. The same points can be found by laying the square diagonally across the timber and "pricking" off 7 and 17.

To make a moulder's flask octagonal proceed as follows: The flask to be four feet across. Multiply $4 \times 5$ (as an octagon is always as 5 to 12 nearly), which gives 20; divide by 12, which gives $1\frac{2}{3}$ feet, cut mitre to suit this measurement, nail into corners of square box, and you have an octagon flask at once.

Another method of constructing an octagon is shown at Fig. 6. Take the side as *a b* for a radius, describe an arc cutting the diagonal at *d*; square over from *d* to *e*, and the point *e* will then be the gauge-guide for all the sides.

Another method (Fig. 7) is to draw a straight line, *c b*, any length; then let *a b* and *a c* be corresponding figures on the blade and tongue of the square, mark along either and measure the distance of required octagon; move the square and mark also. Now use the square the same as before, and the marks *c b* and *b d* are the points required.

If these explanations are not sufficiently clear to the reader, the writer will be pleased to answer any questions regarding them that may be asked through the Question columns of the WOOD-WORKER.

## Hand-Railing.

BY W. H. COOKEN.

FROM B, Fig. 1, Plate 82, square from B C draw B A extended and equal to $1\frac{3}{4}$ risers marked "floor;" produce A B to F and set up the number of risers from "floor," viz. 6; square over at 6 for tread of pitch-board and gauge from rake of pitch-board one half thickness of rail, placing gauge-mark fair to centre of baluster at 6; draw pitch as shown to B C at C; on A as centre with required centre radius of small circle of plan, strike arc seen at G, draw G C touching arc; draw A S parallel to G C; through A square from G C draw G H; extend curve E B to J, and make J H, J I each equal to one half width of rail; draw N B parallel to G C; make G M equal to B F and connect N M, produce the short lines Q (*q*) and R are parallel to M C one half width of rail distant therefrom. K H and I L are parallel to N B. Now draw N O C, Fig. 2, any length, and make O N equal to same letters at Fig. 1, square over N B equal to same letters, Fig. 2; square over O D equal to A S, Fig. 1; connect B D extended, B V being straight shank as required; make O P E P equal to A P E P, Fig. 1; draw P R M Q parallel to O C and equal to O R M Q, Fig. 1. Draw on each side of E one half width of rail and spring line B O. Stand on O as centre and take a

PLATE 83

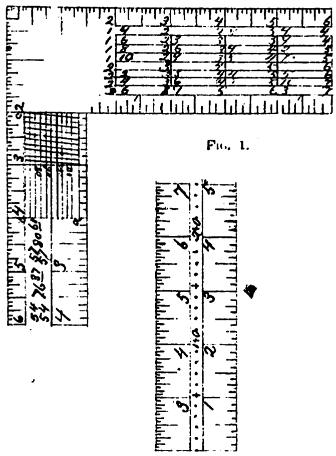

FIG. 1.

FIG. 2.

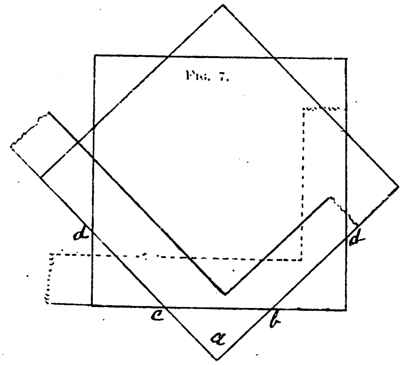


FIG. 7.

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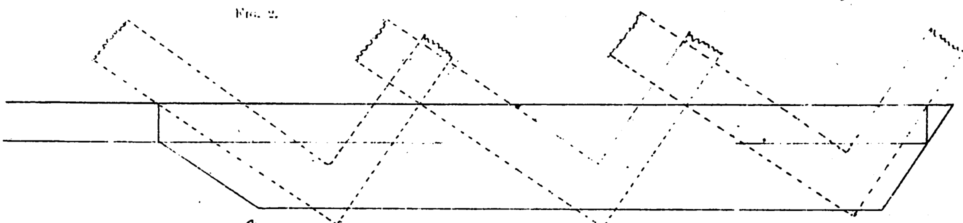

FIG. 3.

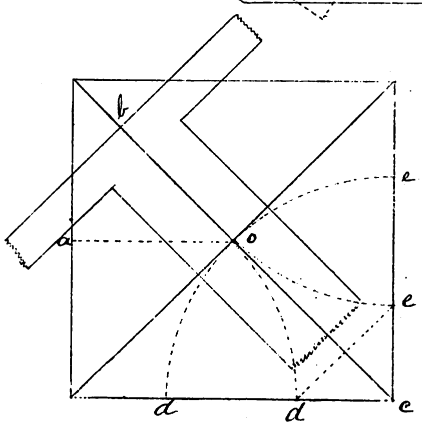


FIG. 4.

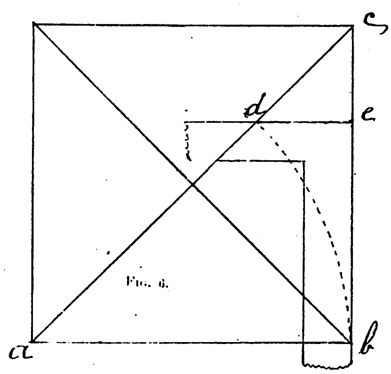


FIG. 6.

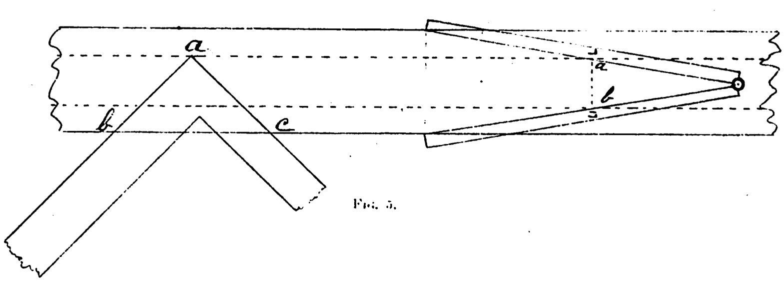


FIG. 5.

*THE "STEEL SQUARE" AND ITS USES.*